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THE UNIVERSITY OF ALBERTA

A COMPARATIVE ANALYSIS OF TYPEWRITING IN
TWO SEMESTER AND NON SEMESTER
PROGRAMS

by



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A THESIS

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The undersigned certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled "A Comparative Analysis of Typewriting in Two Semester and Non Semester Programs," submitted by Mary E. Monaghan in partial fulfilment of the requirements for the degree of Master of Education.



Abstract

This study was designed to determine whether or not there was a significant difference in achievement between Grade 10 students taking Typewriting 10 on a two semester (2S) system and Grade 10 students taking Typewriting 10 on a non semester (NS) system. An extension of the main study was a comparison of achievement of those taking Typewriting 10 for personal use (PU) and those taking Typewriting 10 for vocational use (VU). Specifically, its purpose was to seek answers to: (1) Is there a significant difference in achievement between the two levels of systems? (2) Is there a significant difference in achievement between the two levels of use? and (3) Is there a significant difference in achievement among the two levels of systems and the two levels of use? It was hypothesized that no significant difference existed between and among the two levels of systems and use.

The instrument used was a straight-copy speed and accuracy five-minute timing and a ten-minute timing on production of a business letter.

The subjects consisted of 190 Grade 10 students taking Typewriting 10; 103 on a 2S system and 87 on a NS system. Four high schools in the Edmonton Public School system were used for the study, two in each system.

The data were collected by supervised administration of the instrument. Scores were converted to correct words

per minute (CWPM) typed and were processed at The Computer Centre, University of Alberta.

Analyses of variance were used to compare results of the two levels of systems and two levels of use.

The results of this study revealed: (1) a significant difference in achievement between the two levels of systems, (2) no significant difference in achievement between the two levels of use, (3) a significant difference in achievement between the two levels of systems across the level, personal use, (4) a significant difference in achievement between the two levels of systems across the level, vocational use.

From the foregoing, the researcher concludes: (1) that achievement of Typewriting 10 students on a non semester system is higher than Typewriting 10 students on a two semester system, (2) that achievement scores of Typewriting 10 students taking Typewriting for personal use is not significantly different than Typewriting 10 students taking Typewriting for vocational use.

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Chapter 1

Introduction

Orientation to the Problem

Because of the rapid growth in student population in senior high schools in Alberta in recent years, many demands have been placed on facilities and organization within these schools to improve the effectiveness of learning. There is a wider range in student abilities and interests, and for many their goals have become more immediate. Added to this has been a growing awareness of individual differences which has resulted in dissatisfaction with traditional methods of regulating or providing for pupil progress.

In order to improve the effectiveness of learning for the ever-increasing numbers, there has been a proliferation of courses, programs and methods of teaching. This has necessitated a new look at scheduling. One outgrowth has been semestering.

Many high schools have been on some form of semestering, the most common one being the two semester (2S) system. Students, who might take eight courses in a non semester (NS) year, would, under a 2S system, take four courses in the first semester, write final examinations at the end of January, then take the remaining four and write final examinations in these at the end of June. The

instructional period in a subject is approximately eighty minutes in length; thus, the same amount of material is covered as under the NS system.

No study, as yet, has been done in Alberta in order to assess the value of this system in terms of advantages regarding student performance, efficiency of operation, or instruction.

This study was designed to investigate achievement in one skill subject, Typewriting 10, between students on two levels of system 2S and NS, at two levels of use, personal (P) and vocational (V).

Importance of the Study

A study by Girard (1962) was reported on by Girard and Enns (1964) in which they say that improving the effectiveness of learning is one of the major concerns of the school system. In addition, maintaining or increasing the efficiency of available resources to achieve improvements in learning is also essential.

Coutts and Bergen (1969) point to the fact that new methods of scheduling the school year were tried in many instances, and were reviewed from time to time without concrete evidence that any one system was superior to another. They stressed the importance of experimental research.

There was considerable interest shown in semesterizing in Saskatchewan according to an article in the Trustees' magazine (1969) but it also cautioned that any form of school

organization must be necessarily directed towards the better achievement of educational objectives.

Teaching and administration involves a continuous process of hypothesising, inquiring, experimenting with procedures, evaluating these procedures and revamping wherever and whenever deemed necessary. McDonald (1959) states. if teachers do not assume the responsibility for evaluating their procedures, it is not likely educational practices will be improved. They are hypothesis-makers and must test their hypotheses.

Ingram (1966, p. 45) states:

Decisions regarding the adoption or rejection of an idea are influenced by its relative advantage, its complexity, its compatability with existing value systems, its divisibility and its communicability, as these are perceived by the individuals concerned.

In September 1968, Jasper Place Composite High School was granted permission to implement the 2S system. Prior to seeking this permission, the administration and several staff members from the school visited some schools on the 2S system. In some of these schools they found courses such as Physical Education, Typewriting, Shorthand and Music were not semestered, while the balance of the subjects were. The decision at Jasper Place Composite High School was to semester all courses except Music.

In October 1968, an opinionnaire was administered to the staff to determine their reactions to the new organization of the school year at that time. By and large, as stated by administration, the findings were favorable. In February,

after the second semester was under way, another opinion-naire was distributed to the staff and one to the students to determine (a) their satisfaction or dissatisfaction with the 2S system as such, and (b) their opinions as to the effectiveness of the eighty-minute periods.

Again, their findings were generally favorable. However, no study as yet has been done in order to assess the value of this innovation in terms of student performance, efficiency of operation, or instruction.

In view of the circumstances surrounding learning effectiveness under various forms of school schedules, it appears useful that research efforts be directed toward the investigation of the effectiveness of the 2S system as compared to the NS system for Typewriting in Grade 10 at two levels of motivation, Typewriting for personal use (PU), Typewriting for vocational use (VU).

This study was confined to Typewriting 10 and the achievement of Grade 10 students in this subject in two high schools in Edmonton on the 2S system and to compare their achievement with Grade 10 students in Typewriting 10 in two high schools on the NS system, at two levels of use, P and V.

Problem Statement

The purpose of this study is to investigate whether or not there is any significant difference in achievement of Grade 10 students in Typewriting 10 taught in a 2S system and Grade 10 students in Typewriting 10 taught in a NS system.

Sub Problems

1. To assess and compare the achievement of Grade 10 students in Typewriting 10 in a 2S system with Grade 10 students in Typewriting 10 in a NS system, their goals being personal use (PU).
2. To assess and compare the achievement of Grade 10 students in Typewriting 10 in a 2S system with Grade 10 students in Typewriting 10 in a NS system, their goals being vocational use (VU).
3. To assess and compare the achievement of Grade 10 students in Typewriting 10 taking Typewriting 10 for PU and Grade 10 students in Typewriting 10 taking Typewriting 10 for VU.

Research Hypotheses

This study will test the following null hypotheses:

1. There is no significant difference in achievement between Grade 10 students taking Typewriting 10 in a 2S system and Grade 10 students taking Typewriting 10 in a NS system whether their goals be for PU or VU.
2. There is no significant difference in achievement between Grade 10 students taking Typewriting 10 when their goals are for PU and Grade 10 students taking Typewriting 10 when their goals are for VU, whether they are enrolled in a NS system or a 2S system.
3. There is no significant difference in achievement between Grade 10 students taking Typewriting 10 in a 2S system

and Grade 10 students taking Typewriting 10 in a NS system when their goals are for PU.

4. There is no significant difference in achievement between Grade 10 students taking Typewriting 10 in a 2S system and Grade 10 students taking Typewriting 10 in a NS system when their goals are for VU.

Scope and Limitations

The sampling for this study was limited to four high schools in the City of Edmonton, two high schools on a 2S system and two on a NS system. Pupils involved in the study were not selected on any particular basis of age, sex, I.Q. or degree of dexterity, but were enrolled in Typewriting 10. The classes used were those volunteered by typewriting teachers in the schools selected. There was no particular criteria used in the selection of the high schools, other than those using the Gregg 191 Series Typewriting text. No special treatment was given these students.

The amount of time spent by each student in classes, due to absences or other reasons, was recognized as a limitation of the study.

The tests were administered at different times of the day and different days of the week. These were recognized as limitations of the study.

Initial Assumptions

It was assumed that student response as to reason for

taking typewriting were either for PU or VU. This response was in answer to a simple question--are you taking Typewriting for personal or vocational use?

Classifying the population in terms of sex will not affect the results of data gathered, or be used in this study but may be useful in the future.

The same text, Gregg 191 Series, was used by all classes. It is assumed, therefore, that the teacher variable was reduced and would give some stability to the study. Approximately the same number of lessons in the text, and therefore the same basic amount of material was covered by all classes.

The difference in length of individual periods of instruction was offset by the total instructional time being the same.

Some students will practice typewriting in other than class periods, regardless of the system used, and some will not; therefore, it was assumed the practice time did average out.

Since dexterity tests were not used for admission to the course, dexterity as a factor was disregarded as having any significant bearing on the results.

Population and Sampling

The subjects in this study numbered 190 Grade 10 students in Typewriting 10 and were from four high schools in Edmonton, two high schools on the 2S system and two high

schools on the NS system. The schools were selected at random from those using the text mentioned. The students used for the study were members of classes taught by teachers who were selected on an available basis or who volunteered for the study. The total population of the classes participated but scores for Grade 10 students only were used in the study. In addition to taking the test administered, the students were asked to respond to a simple question, as previously stated, with the answers being either for PU or VU.

The other factor noted regarding the sampling was sex.

Definitions

Two semester system (2S). A school year divided into two parts, September 1 to January 31 and February 1 to June 30 with final examinations at the end of each semester.

Non semester system (NS). A school year running from approximately September 1 to June 30 with final examinations at the end of June in all subjects.

Vocational use (VU). For purpose of employment.

Personal Use (PU). For use in other than employment.

Goals-motivational levels. These two terms were used interchangeably in the study.

Straight copy timing. A timing on typing from a typewritten copy as it appears.

Production timing. Referred to in this study as a business letter, with proofreader's corrections, to be typed as often as time permits in corrected form.

Timed writing. Typing to be done within a specified limit of time.

Typewriting 10. A five credit first-year course in Typewriting as described in the Alberta Senior High School Curriculum Guide for Business Education (1969).

Typewriting 20. A five credit second-year course in Typewriting as described in the Alberta Senior High School Curriculum Guide for Business Education (1969).

Typewriting 30. A five credit third-year course in Typewriting as described in the Alberta Senior High School Curriculum Guide for Business Education (1969).

Correct words per minute (CWPM). The deduction of errors from the total words typed.

Syllabic intensity. The average number of syllables in a test per typewritten word.

Word. Any five consecutive typewriting strokes including the space stroke.

Chapter 2

Related Literature and Theory

There seems to be very little research done on semestering in Alberta despite the fact that more and more schools are adopting this system and others are anticipating such a move.

According to figures quoted in Fehlberg's study (1968) seven institutions were on the semester system in 1960, thirty-two in 1966 and ninety-four in 1967. Statistics received from the Department of Education in December 1969 show 228 schools approved for semestering up to the Grade XII level (see Appendix D).

Fehlberg (1968) investigated the relationship between student achievement under the semester system and student achievement under the ten-month (conventional) system of school organization with achievement in three subjects (English 30, Social Studies 30 and Mathematics 30) being the areas analyzed. His findings indicated there was no significant difference in English 30 and Mathematics 30. In Social Studies 30, however, there was a significant difference, favoring the semester system.

In an appraisal of the semester system, Church (1968) outlined the Alberta and United States arrangements in addition to other possibilities of modification. Some of the commonly stated advantages of semestering relative to

student achievement were: better achievement due to intensified instruction, increased motivation because of more immediate goals, greater depth in study and more efficient use of class time in some subjects due to longer periods of instruction, and greater possibility of alternating theory and practice because of lengthened periods. Included in the disadvantages was the possibility of superficiality in learning because of the condensed term and forgetting due to a layover from one semester to another. He concluded that, due to lack of research, one must rely on opinions of those who have been on such a system. Teachers and administrators have expressed reservations in regard to semestering skill subjects when the use of these acquired skills may have to be held in abeyance for future application. He states that it has not been proven that the semester system is superior to any other arrangement of high school programs. Generally, students, teachers and administrators favor it but reservations have been expressed in some areas, such as French, Typewriting, Shorthand, Physical Education and Music. He adds that semestering allegedly does not provide for the maintenance of a skill at a reasonable level.

The purpose of semestering, according to an article in the Saskatchewan School Trustees' Association The School Trustee (1969), is to provide for flexibility in teaching and learning situations. Similar advantages and disadvantages as expressed by Church (1968) are mentioned. The article cautions that the type of scheduling used must be closely

studied in order to properly meet the needs of students.

According to Coutts and Bergen (1969) the Alberta Department of Education studied divided year plans as early as 1951 and at that time expressed preference for semestering. A committee was formed in 1968 under the chairmanship of the chief superintendent of schools, Department of Education in Alberta, to further explore different methods of dividing the school year and to look at factors related to the types of divided years in Alberta schools. Coutts and Bergen (1969) presented a proposal for scheduling the school year whereby schools would operate most of the year. This proposal, as stated, was similar to one presented by Coutts to the Senate of the University of Alberta for schools and universities.

Carlson (1965) points out that school systems try to adjust their environment by various means, such as by changing objectives, structure, size and personnel, and by new practices in instruction. He felt that there were theoretical advantages to semester terms in colleges and one of these was enhancement of the quality of teaching.

Some interesting points have been raised in recent studies in typewriting.

In a study on the prognosis of success in typewriting, Eckert (1966) states: "the most proficient typists after two weeks of instruction tend to remain the most proficient typists as the course continues."

A study by Craig (1961) was conducted to compare achievement in three typewriting classes to determine the

following:

- (a) Does a class which meets five days a week for one semester achieve more than a class meeting fewer days a week in a semester?
- (b) Does a class which meets five days a week for one semester achieve more than a class meeting fewer days a week over a period of one year?
- (c) Does a class which meets five days a week over one year achieve more than a class meeting fewer days a week over one year?

Craig's (1961) study reported that students meeting five days a week in one semester achieve more speed than students meeting less often in a semester, and the class which met five days a week for a semester did not achieve much more speed, nor more accuracy, than those students who met for less than five days a week for the whole year. In her comparison study Group I (meeting five days a week all year) were a vocational typing class; Group II (meeting two days a week the first semester and three days a week the second semester) were a personal use typing class; Group III (meeting three days a week the first semester and two days a week the second semester) were a personal use class as well. The three groups were close in speed achievement at the end of thirty instructional periods. Group I was superior at the end of sixty and ninety instructional periods.

In spacing of practice methods Russon and Wanous (1960) state that the use of double periods for typewriting

classes is being superceded by the scheduling of the single period. Gates, Jersild, McConnell and Challman (1948) write that distributed learning is superior to concentrated practice because of several factors. Among these are, (1) the possibility of distributed practice favoring a variety of responses, (2) the tendency of massed practice to establish errors in form, and (3) during rest periods the learner may gain insight into the task. Russon and Wannous (1960) claim Skinner supports this view by stating that distributed practice is superior to massed practice in learning complex motor skills like typewriting. Kingsley (1957) says that practice periods should be long enough to avoid the decrement in work resulting from fatigue. Wheeler (1937) claims that it has been found that for most students, thirty-minute practices are best and the rest period between practices should be twenty-four hours. Russon and Wannous (1960) also suggest that we follow the advice of educational psychologists and devote not more than thirty minutes of a period to speed and accuracy practice and the remaining fifteen minutes to problem typing.

Although many advantages and disadvantages have been cited in various articles and submissions, there is a need for more empirical evidence that student achievement is superior under the semester system, or for that matter, any different.

Chapter 3

Method

The Subjects

The subjects were 190 Grade 10 students enrolled in Typewriting 10, 103 students on a 2S system and 87 on a NS system. In the 2S group there were 64 subjects taking Typewriting for PU and 39 for VU. In the NS group there were 55 taking Typewriting 10 for PU and 32 for VU. Table 1 presents the 190 subjects by system (2S and NS) across use (P and V).

The Instrument

The instrument as originally designed and used in a pilot study was in three parts: (a) a five-minute straight copy timing, (b) a five minute timing on a handwritten manuscript to be typed, (c) a ten-minute timing on a business letter. The consensus amongst teachers was that three timed writings, in addition to a warmup, at this grade level resulted in fatigue. It was agreed that the information sought could be obtained quite satisfactorily from two timed writings. Therefore, the instrument was further refined as follows:

- (a) a five-minute speed and accuracy test on straight-copy material with a syllabic intensity of 1.30

Table 1

Subjects in Each System by Use

System	Use		Total
	P	V	
2S	64	39	103
NS	55	32	87
Total	119	71	190

and taken from the text. A syllabic intensity of 1.30 is considered average in difficulty and is used by the author of the text at the end of the first year of typewriting.

- (b) a ten-minute timing on a business letter containing corrections to be made and of average length.

Sample copies of the instrument appear in Appendix B and in Appendix C.

Chapter 4

Collection of the Data

The Administration of the Instrument

In advance of administration of the instrument, teachers whose classes were used, were notified of the nature of the test, the length of the timings and the syllabic intensity of the straight-copy material. This was to ensure that all students had experience with five-minute timings and on material with a syllabic intensity of at least 1.30.

Subjects in each class were told the nature of each part of the instrument just prior to its being administered and were given time to set margins, tabulator stops, line spacing and allowed a three-minute warmup before the two parts were given. Appendix A is a copy of the instructions given.

An interval timer was used for all timings.

Scoring Procedure

Typing rates of CWPM were found on each part of the test and these two scores were averaged for each subject to yield one score of CWPM for each subject. All papers were checked and scored by the researcher for better uniformity in final scores. Each part of the instrument was weighted equally. This follows the suggestion in the Senior High School Curriculum Guide for Business Education which states:

Suggested Final Evaluation of Typewriting 10		
Speed and accuracy		50%
Problem and production work		50%

Experimental Design

The experimental design as illustrated by Kerlinger (1964) and Edwards (1969) was considered suitable for this study. The independent variables, system and use, were classified as follows:

System	Two semester instruction (2S)	
	Non semester instruction (NS)	
Use	Personal	(PU)
	Vocational	(VU)

The dependent variable was achievement scores (CWPM) obtained on the Typewriting test administered. One hundred and ninety (190) scores were used in the data analyses, one hundred and three (103) 2S scores and eighty-seven (87) NS scores.

Statistical Design

Conditions for this experiment were appropriate for use of Scheffes (1960) least squares solution under additivity assumption (no interaction between system and use) with analyses of variance of main effects and simple main effects. A level of .05 was considered to be significant.

Typing speeds on straight-copy material and production timings were converted to CWPM to yield an achievement score for each subject.

All data were processed at the Computer Centre, University of Alberta.

	PU	VU
2S	2S.PU	2S.VU
NS	NS.PU	NS.VU

Hypotheses to be Tested

Hypothesis 1	$2S = NS$
2	$PU = VU$
3	$2S.PU = NS.PU$
4	$2S.VU = NS.VU$

Fig. 1. Schematic of experimental design.

Chapter 5

Results

Test for Additivity

An inspection of Table 2 shows that the observed F ratio did not exceed the critical value .05 (3.89). There is no interaction between the systems and use.

Main Effects

The results of the Analyses of Variance of Main Effects are presented in Tables 3 and 4. The between systems analysis yielded a significant F ratio (12.320; $p < .01$). The between uses analysis yielded an F ratio (2.677) which was not significant.

Simple Main Effects

Having found a significant difference between 2S and NS mean scores it is essential to examine and analyze the simple main effects.

The analyses of variance for simple main effects are presented in Tables 5, 6, 7 and 8.

The observed F ratio for the PU subjects (7.850; $p < .01$) in Table 5 indicates a significant difference in achievement in the two systems.

The Observed F ratio for the VU subjects (4.4065; $p < .05$) in Table 6 indicates a significant difference in

Table 2

Analysis of Variance

To Test for Additivity

Source of Variation	Sum of Squares	Df	Mean Squares	F
Between Groups	.125	1	.125	.001539
Within Groups	14111.100	187	81.242	

* $p < .05$

Table 3

Analysis of Variance

Main Effects for System

Source of Variation	Sum of Squares	Df	Mean Squares	F
System	995.592	1	995.592	12.320 **
Within Groups	15111.200	187	80.808	

** $p < .01$

Table 4

Analysis of Variance

Main Effects for Use Level

Source of Variation	Sum of Squares	Df	Mean Squares	F
Use	216.328	1	216.328	2.677
Within Groups	15111.200	187	80.808	

* $p \leq .05$

Table 5

Analysis of Variance

Simple Main Effects for System Use P

Source of Variation	Sum of Squares	Df	Mean Squares	F
Use P	637.789	1	637.789	7.850 **
Within Groups	81.242	187		

** $p < .01$

Table 6

Analysis of Variance

Simple Main Effects for System Use V

Source of Variation	Sum of Squares	Df	Mean Squares	F
Use V	358.000	1	358.000	4.4065 *
Within Groups	81.242	187		

* $p \leq .05$

Table 7

Analysis of Variance

Simple Main Effects for Use Level System 2S

Source of Variation	Sum of Squares	Df	Mean Squares	F
System 2S	124.3361	1	124.3361	1.5304
Within Groups	81.2423	187		

* $p \leq .05$

Table 8

Analysis of Variance

Simple Main Effects for Use Level System NS

Source of Variation	Sum of Squares	Df	Mean Squares	F
System NS	92.1838	1	92.1838	1.1346
Within Groups	81.2423	187		

* $p \leq .05$

achievement in the two systems.

The observed F ratio (1.5304) in Table 7 indicates no significant difference in achievement between use levels in the 2S system.

The observed F ratio (1.1346) in Table 8 indicates no significant difference in achievement between use levels in the NS system.

Testing Hypotheses Summary

The means of the group are presented in Table 9.

Null Hypothesis 1 There is no significant difference in achievement between Grade 10 students taking Typewriting 10 in a 2S system and Grade 10 students taking Typewriting 10 in a NS system whether their goals be for PU or VU.

		N	Mean
2S = NS	2S	103	24.1
	NS	87	28.7

Observed F ratio = 12.320 Critical value $F_{95} = 3.89$

Null Hypothesis 1 is rejected.

Null Hypothesis 2 There is no significant difference in achievement between Grade 10 students taking Typewriting 10 when their goals are for PU and Grade 10 students taking Typewriting 10 when their goals are for VU.

Table 9

Means of the Groups

	PU	VU	
2S	23.26	25.53	24.1
	N=64	N=39	N=103
NS	27.90	30.04	28.7
	N=55	N=32	N=87
	25.4	27.6	26.2
	N=119	N=71	N=190

PU = VU	N	Mean
	119	25.4
	71	27.6

Observed F ratio = 2.677 Critical value $F_{95} = 2.89$

Null Hypothesis 2 is not rejected.

Null Hypothesis 3 There is no significant difference in achievement between Grade 10 students taking Typewriting 10 in a 2S system and Grade 10 students taking Typewriting 10 in a NS system when their goals are for PU.

2S.PU = NS.PU	2S.PU	N	Mean
		64	23.26
	NS.PU	55	27.90

Observed F ratio = 7.850 Critical value $F_{95} = 3.89$

Null Hypothesis 3 is rejected.

Null Hypothesis 4 There is no significant difference in achievement between Grade 10 students taking Typewriting 10 in a 2S system and Grade 10 students taking Typewriting 10 in a NS system when their goals are for VU.

2S.VU = NS.VU	2S.VU	N	Mean
		39	25.53
	NS.VU	32	30.04

Observed F ratio = 4.406 Critical value $F_{95} = 3.89$

Null Hypothesis 4 is rejected.

Chapter 6

Summary, Implications and Recommendations

Summary

This study was designed to determine if there was a significant difference in achievement between students in Typewriting 10 on a 2S system and those on a NS system. This information was considered important in view of the fact schools in increasing numbers are moving toward the 2S organization of the school year, and research studies providing empirical evidence of compared achievement under 2S and NS systems is limited. Added to this, is the apparent reluctance of some schools in semesterizing skill subjects.

An extension to the main study was a further classification of the population sample into two sub groups--those students taking Typewriting for (a) PU and (b) VU. The subjects were 190 students, 103 on the 2S system and 87 on the NS system. Sub group distribution included 119 PU and 71 VU.

The data were collected by administering typewriting tests to the subjects and the results were converted to CWPM scores which supplied the raw input for the computer. An analysis of variance was used to compare the groups for main effects and supplementary variance analyses for

simple main effects.

The empirical findings of this study relative to the research hypotheses listed on page 5 are summarized as follows:

Hypothesis 1 was rejected. There was a significant difference between the means (24.1 and 28.7, Table 9) of these two groups, 2S and NS, with the NS group scoring higher.

Hypothesis 2 was not rejected. There was no significant difference in the means of PU and VU subjects taking Typewriting (25.4 and 27.6, Table 9).

Hypothesis 3 was rejected. There was a significant difference between the means (23.26 and 27.90, Table 9) of 2S subjects taking Typewriting for PU and NS subjects taking Typewriting for PU with the NS group scoring higher.

Hypothesis 4 was rejected. There was a significant difference in the means of 2S subjects taking Typewriting for VU and NS subjects taking Typewriting for VU (25.53 and 30.04, Table 9) with the NS group scoring higher.

Implications

On the basis of the findings presented in this study, there was a significant difference in achievement scores between the 2S and NS systems with the NS students scoring higher. It may well be that longer periods, which are necessary in two semester systems as we have in Alberta, do not necessarily accomplish twice as much as shorter

periods; that practice spread out over a longer period of time has a positive influence on achievement in skill subjects. This would tend to support Craig's study (1961) and recommendations by Russon and Wanous (1960).

In this study it was found that achievement by students taking Typewriting for personal use and those taking Typewriting for vocational use was not significantly different. It is possible then, that there is no need to separate these students as is done in some schools in their first year of Typewriting.

Other questions arise from the findings. Does a more intensive type of instruction result from longer periods and semestering and does this result in better achievement as cited by Church (1968)? In a semester system can skills be retained until some time in the future in the world of work? Is the loss of continuity a serious problem in semester systems and is it any more of a problem than loss of continuity experienced through a regular summer vacation period? These call for experimental investigation.

Recommendations

In view of the concern expressed in some of the related literature for semestering skill subjects and the findings in this study, the following recommendations are suggested:

1. This study should be replicated in other schools in the province.
2. Research should be carried out in Typewriting 20 and 30 in the two systems (2S and NS).
3. Research is needed in other skill subjects which are semestered, such as Shorthand, Physical Education and Music.
4. More research is needed on the retention of skills.
5. Additional research should be conducted in blocking subjects with Typewriting for the purpose of studying fatigue.
6. More research on spacing of Typewriting periods is recommended.
7. Research is needed to determine if innovation is synonymous with improvement. What are the reasons for semestering? Are they for flexibility in programming, administrative expediency, joining the crowd, or to better meet the needs of students and the goals of education?

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Appendices

Appendix A

Directions for Administering the First Part of the Instrument

This is a five-minute timing on straight copy type-written material. Set your margins for a seventy-space line and a five space indent for paragraphs. It is to be double spaced. You may have a three-minute warmup after which you will insert a clean sheet and type as much of the typewritten material as you can in five minutes when I say "begin."

Directions for Administering the Second Part of the Instrument

This is a business letter with corrections to be made as shown. Set your margins, tabulator stops and line spacing. You will be given three minutes to read over the letter. Then you will insert your paper and when I say "begin" you will type the letter as often as you can in the ten minutes allowed. You will hand in all letters and parts of letters typed.

We used to raise peppers back on the farm where I grew
up as a boy. They were big and green, the kind you like in
salads, and we raised them in rows and rows of bushes. One
time I asked my dad if there was a connection between those
we raised and what we shook out of the pepper shaker on the
table. He said he thought there must be: that the stuff in
the shaker was probably just a dried version of green ones.

Well, I went along with that for years and years until
one day a college professor told our class why Columbus had
set out to find a new route to the Indies. Do you know why
he sought the Indies? He wanted pepper. It seems that all
the voyagers of those days were after spice, but what those
men called spice is what we call pepper. Now, this did not
seem correct to me, so I read up on pepper. Dad was wrong.

The kind of pepper we use on the table grows on a vine
that climbs like ivy and has leaves like philodendron. The
peppers are the berries of the vine, growing in a string or
cluster like currants. The berries are dried and ground up
into the black pepper we like, or the berries may be soaked
until the black shell falls off, leaving white kernels that
become mild white pepper after they are dried and powdered.

In the days of Columbus, the only place you could find
pepper berries was along the southern coast of India and on
the nearby islands, which were called "the Indies." To get
to the Indies from Europe, a trader had to sail all the way
around Africa and across the Indian Ocean. Columbus had an
idea that he could get there sooner by sailing west; he got
a chance to try his idea, but you know how that trip ended.

For hundreds of years the spice ships, including those
famous New England clippers, made long trips to get pepper.
It was worth so much that the profit on a single trip would
pay for the whole ship. Today pepper is still big business
all over the world. Why, Americans alone use forty million
pounds of pepper a year. This is nothing to be sneezed at!

February 5, 196-

Mr. John Fitch, ^President
 The Darris Company
 3674 Norrand Bld.
 Kitchener, Ontario

Dear Mr. Fitch:

Ever since the meeting at which ^{we} ~~all of us~~ talked about
 the theme of our spring promotion, I have been thinking
 about the wording of the first ~~Paragraph~~. It seems to
 me that it might be much better ~~if worded~~ like this:

What is space? To a housewife, space is an
 empty cupboard. To a scientist, space is the
 black void between planets. To us at Croxton,
^{though,} ~~however,~~ space is business.

After reaching such a ~~fine~~ paragraph, almost anyone will
 ask, "How can space be a business?" Thus, a reader is ^{then} ~~drawn in~~
 to the description of how we help industry ~~to~~
 solve space problems of a ~~hundred~~ kinds.

I am not a copy writer, and I know it. ^{thousand} Yet, I feel there
 is some merit in this humane approach. May I have ~~the~~
~~benefit of~~ your reaction to the whole idea?

Sincerely Yours,

^{+ #}
 R. Randolph Hall
 Advertising ^Manager

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GOVERNMENT OF THE PROVINCE OF ALBERTA

DEPARTMENT OF EDUCATION

Administrative Building
10820 - 98 Avenue
Edmonton 6, Alberta.
December 12, 1969.

Dear Mr. Monaghan:

In reply to your letter of November 22nd I am enclosing a copy of our list of approved semester schools in Alberta. These are schools which involve semestering at the Grade XII level. There may be many other schools which semester to a greater or lesser degree.

The only way to determine which schools semester and the extent to which they semester is to examine all of the A Cards School Registration Forms. We are not prepared to do so but you may come to the Department and these will be made available for you to examine.

Yours sincerely,

"E. J. M. Church"
Director of Special Services

Mrs. H. J. Monaghan
10965 - 165 Street
Edmonton, Alberta.

Semester Schools

September, 1969

SCHOOL DISTRICTSProvost R.C.S.S.D. No. 65

St. Thomas Aquinas High School, Provost.

Bow Island R.C.S.S.D. No. 82

St. Michael's High School, Bow Island.

St. Albert S.D. No. 3

St. Albert High School, St. Albert

Edmonton S.D. No. 7

Old Strathcona High School

Jasper Place Composite High School

Ross Sheppard Composite High School

Victoria Composite High School

Rehabilitation Centre

McNally Composite High School

Queen Elizabeth Composite High School

Edmonton R.C.S.S.D. No. 7

St. Mary's High School

Assumption Academy

St. Joseph Composite High School

Calgary S.D. No. 19

James Fowler High School

Bowness High School

Forest Lawn High School

Ernest Manning High School

Queen Elizabeth High School

Crescent Heights High School

Viscount Bennett High School

Georges P. Vanier Jr. High School

Bowness Jr. High School

Western Canada High School

Henry Wise Wood High School

Sir Winston Churchill High School

Central Memorial High School.

Calgary R.C.S.S.D. No. 1

St. Francis High School

SCHOOL DISTRICTS - Page No. 2Calgary R.C.S.S.D. No. 1 (cont'd.)

Bishop Grandin High School
Assumption School
St. Augustine School
St. Helena School
St. Margaret School
Holy Cross School
Bishop Kidd School
St. Alphonsus School
St. Bernadette School
St. Stephen School
St. Anne School
Sacred Heart School
St. Peter School

Camrose S.D. No. 1315

Camrose Composite High School

Lethbridge S.D. No. 51

Winston Churchill High School (modified school year)

Lethbridge R.C.S.S.D. No. 9

Catholic Central High School

Medicine Hat S.D. No. 76

Medicine Hat High School
Crescent Heights High School

Medicine Hat R.C.S.S.D. No. 21

McCoy High School

Pincher Creek R.C.S.S.D. No. 18

St. Michael's High School, Pincher Creek

Theresetta R.C.S.S.D. No. 23

Theresetta School, Castor

Taber R.C.S.S.D. No. 54

St. Mary's High School, Taber
St. Mary's Jr. High School, Taber

SCHOOL DISTRICTS - Page No. 3Grande Prairie R.C.S.S.D. No. 28

St. Joseph's Jr./Sr. High School, Grande Prairie

Red Deer S.D. No. 104

Lindsay Thurber Composite High School (Trimester)

Banff School District No. 102

Banff High School

Wetaskiwin School District No. 264

Wetaskiwin Composite High School

St. Paul S.D. No. 2228

Racette Sr. High School, St. Paul

Red Deer R.C.S.S.D. No. 17St. Thomas Aquinas
Camille J. Lerouge (trimester)Stettler S.D. No. 1475

W. E. Hay Composite High School

Forestburg Consolidated S.D. No. 45

Forestburg High School

Fahler Consolidated S.D. No. 69

Fahler Cons. High School

Cold Lake R.C.S.S.D. NO. 64

St. Dominic's High School, Cold Lake

St. Thomas More R.C.S.S.D. No. 35

St. Thomas More School, Fairview

Valleyview R.C.S.S.D. No. 84

St. Stephen's High School, Valleyview

Canmore S.D. No. 168

Canmore High School

SCHOOL DISTRICTS - Page No. 4St. Albert P.S.S.D. No. 6

Paul Kane High School

Grande Prairie S.D. No. 2357

Grande Prairie High School

Grande Prairie Vocational High School

Stirling S.D. No. 647

Stirling High School

High River S.D. No. 144

High River High School

Westlock R.C.S.S.D. No. 110

St. Mary's School, Westlock

Peace River R.C.S.S.D. No. 43

Glenmary School, Peace River

Bonnyville S.D. No. 2665

Notre Dame High School, Bonnyville

Glen Avon P.S.S.D. No. 5

Glen Avon School, St. Paul

Salisbury R.C.S.S.D. No. 105

Salisbury R.C. High School, Salisbury

SCHOOL DIVISIONSBerry Creek S.D. No. 1

New Cessford High School, New Cessford

Cardston S.D. No. 2

Cardston High School, Cardston
 Del Bonita High School, Del Bonita
 Glen Hill High School, Glenwood
 Magrath High School, Magrath

Acadian S.D. No. 8

South Central High School, Oyen
 Cereal High School, Cereal
 Kitchner High School, Empress

Peace River S.D. No. 10

Peace River High School, Peace River
 Berwyn High School, Berwyn
 Grimshaw High School, Grimshaw
 Manning High School, Manning

Edson S.D. No. 12

Evansburg High School, Evansburg
 Harry Collinge High School, Hinton
 Parkland Composite High School, Edson
 Niton Central High School, Niton

Rocky Mountain S.D. No. 15

Caroline High School, Caroline
 David Thompson High School, Condor
 Rocky Mountain House J./Sr. High School, Rocky Mountain House

Neutral Hills S.D. No. 16

Altario High School, Altario
 Consort High School, Consort

Willow Creek S.D. No. 28

J. T. Foster High School, Nanton
 Claresholm High School, Claresholm
 Stavelly High School, Stavelly
 MacLeod High School, MacLeod

Pincher Creek S.D. No. 29

Matthew Halton High School, Pincher Creek

SCHOOL DIVISIONS - Page 2Pincher Creek S.D. No. 29 (cont'd.)

Livingstone School, Lundbreck

Wainwright S.D. No. 32

Dr. Folkins High School, Chauvin
Wainwright High School, Wainwright
Edberg School, Edberg

Provost S.D. No. 33

Provost High School, Provost
Central High School, Hughenden

Foothills S. D. No. 38

Turner Valley High School,
Turner Valley
Okotoks High School,
Okotoks

Calgary S.D. No. 41

Cochrane High School, Cochrane
George McDougall High School, Airdrie
Chestermere High School, Chestermere
Kathyrn High School, Kathyrn
Springbank High School, Springbank

Bonnyville S.D. No. 46

Ardmore High School, Ardmore
Fort Kent High School, Fort Kent
Grande Centre High School, Grande Centre
Cold Lake High School, Cold Lake
Glendon School, Glendon
Duclos School, Duclos
Iron River School, Iron River

Spirit River S.D. No. 47

Eaglesham High School, Eaglesham
Wanham High School, Wanham
Rycroft High School, Rycroft
Spirit River High School, Spirit River

High Prairie S.D. No. 48

Prairie River High School, Prairie River
Donnelly High School, Donnelly

Fairview S.D. No. 50

Worsley High School, Worsley

SCHOOL DIVISION - Page 3Fairview S.D. No. 50 (cont'd.)

Hines Creek High School, Hines Creek
Fairview High School, Fairview

Lac La Biche S.D. No. 51

J. A. Williams High School, Lac La Biche
Plamondon High School, Plamondon

Ft. Vermilion S.D. 52

La Crete School
Rocky Lane School (10 & 11)

East Smoky S.D. No. 54

Valleyview High School, Valleyview
Ridgevalley School Crooked Creek

Three Hills S.D. No. 60

Carbon High School, Carbon
Torchu Valley High School, Trochu Valley
Linden High School, Linden
Torrington High School, Torrington
Three Hills High School, Three Hills
Acme High School, Acme

Drumheller Valley S.D. No. 62

Drumheller Composite High School, Drumheller
Delia High School, Delia
Morrin High School, Morrin

Crowsnest Pass School Division No. 63

Horace Allen High School, Coleman
Isabelle Sellon High School, Blairmore

COUNTIESCounty of Grande Prairie No. 1

Sexsmith High School, Sexsmith
Hythe School, Hythe
Beaverlodge School, Beaverlodge
Wembley High School, Wembley

County of Vulcan No. 2

County Central High School, Vulcan (9-12)
Lomond School, Lomond

County of Ponoka No. 3

Ponoka High School, Ponoka
Rimbey High School, Rimbey

County of Newell #4

Duchess High School, Duchess
Rosemary High School, Rosemary

County of Warner No. 5

Erle Rivers High School, Milk River
Warner High School, Warner
Raymond High School, Raymond
Wrentham Jr. High School
Warner Jr. High School
Milk River Jr. High School

County of Stettler No. 6

Donalda School, Donalda

County of Thorhild No. 7

Thorhild Academic Vocational High School, Thorhild

County of Forty Mile No. 8

Foremost High School, Foremost
Senator Gershaw High School, Bow Island
Manyberries High School, Manberries (French 20 - 30 only)

County of Beaver No.9

Viking School, Viking

County of Wetaskiwin No. 10

Pigeon Lake Regional High School, Falon

COUNTIES -- Page 2County of Wetaskiwin (cont'd.)

Winfield High School, Winfield

County of Athabasca No. 12

Edwin Parr Composite High School, Athabasca
Boyle High School, Boyle

County of Smoky Lake No. 13

Vilna High School, Vilna
Smoky Lake High School, Smoky Lake

County of Lacombe No. 14

M. A. C. Central High School, Alix
Eckville High School, Eckville
Lacombe Composite High School, Lacombe
Bentley Sr. High School, Bentley

County of Wheatland No. 16

Samuel Crowther High School, Strathmore
Cluny High School, Cluny
Standard High School, Standard

County of Mountain View No. 17

Didsbury High School, Didsbury
Carstairs High School, Carstairs
Cremona School, Cremona
Sundre School, Sundre
Olds High School, Olds

County of Paintearth No. 18

Castor High School, Castor
Coronation High School, Coronation

County of St. Paul No. 19

Ashmont High School, Ashmont

County of Strathcona No. 20

Salisbury High School, Salisbury
Ardrossan High School, Ardrossan
Ft. Saskatchewan High School, Ft. Saskatchewan

COUNTIES - Page 3County of Two Hills No. 21

Willington High School, Willington

County of Camrose No. 22

Round Hill High School, Round Hill
Bashaw High School, Bashaw
Edberg High School, Edberg
Hay Lakes High School, Hay Lakes
Rosaline High School, Rosaline
Bawlf School, Bawlf
New Norway School, New Norway
Meeting Creek High School, Meeting Creek

County of Red Deer No. 23

Spruce View High School, Markerville
Bowden School, Bowden
Sylvan Lake School, Sylvan Lake (7 - 12)
Delburne Centralized School, Delburne
Innisfail High School, Innisfail

County of Vermilion River No. 24

Dewberry School, Dewberry
Marwayne School, Marwayne
Kitscoty School, Kitscoty
J. R. Robson School, Vermilion
Paradise Valley School, Paradise Valley

County of Leduc No. 25

Leduc Composite High School, Leduc
Devon High School, Devon
Warburg High School, Warburg
New Sarepta High School, New Sarepta
Calmar High School, Calmar

County of Lethbridge No. 26

Kate Andrews High School, Coaldale
Noble Central High School, Nobleford
Picture Butte High School, Picture Butte

County of Lac Ste. Anne 28

Whitecourt Hilltop High School, Whitecourt
Onoway High School, Onoway

COUNTIES - Page 4County of Flagstaff No. 29

Central High School, Sedgewick
Daysland High School, Daysland

County of Lamont No. 30

Lamont High School, Lamont
Andrew High School, Andrew
Mundare High School, Mundare

County of Parkland 31

Frank Maddock High School, Drayton Valley
Memorial Composite High School, Stony Plain

JUNIOR COLLEGES

Lethbridge Junior College
Mount Royal Junior College, Calgary
Medicine Hat Junior College (evening classes only)

PRIVATE SCHOOLS

Holy Redeemer College, Edmonton
North American Baptist College, Edmonton
Alberta College, Edmonton
Camrose Lutheran College
Canadain Union College, College Heights
Calvin Christian High School, Edmonton
Prairie High School, Three Hills

OTHER

Beaver River High School, Canadian Forces Base, Cold Lake
Blood R.C. Indian High School, Cardston
Yellowknife High School, Yellowknife N.W.T.
Fairview School of Agriculture
Calgary Adult Education Division
Edmonton Adult Education Division

Medicine Hat Jr. College Night School
Biggin Hill School District No. 5029 Night School
Edson School Division No. 12 Night School
Pincher Creek School Division No. 29 Night School
Red Deer School District No. 104 Night School

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